STATE OF MONTANA
MONTANA DEPARTMENT OF TRANSPORTATION
JOB PROFILE

☑ Update

☐ Formal Review

Date Submitted: 09/12/2011

SECTION I - Identification

Working Title: Traffic Signal Engineer

Department: Transportation

Job Code Number: 172537

Division & Bureau: Traffic & Safety Bureau

Job Code Title: Civil Engineering Specialist

Section & Unit: Traffic Engineering

Pay Band: 7

Work Address: Helena

Position Number: 36004

☐ FLSA Exempt ☑ FLSA Non-Exempt ☑ Non-Union ☐ MPEA ☐ Blue Collar

Profile Completed By: Roy Peterson

Work Phone: 444-9252

Work Unit Mission Statement or Functional Description:

The Highways and Engineering Division prepares projects for bidding and coordinates highway construction. The division is made up of the Materials, Construction, Right-of-Way, Bridge, and Preconstruction Bureaus; the CADD Systems and Engineering Management Support Sections; and five District Construction Offices in Missoula, Butte, Great Falls, Glendive, and Billings for budget and workforce purposes.

The Traffic and Safety Bureau is responsible for managing and coordinating highway safety programs and for providing management, design and technical support with respect to traffic engineering within the department. The Bureau is responsible for developing and reviewing plans and specifications for highway safety projects including signing, geometric features, pavement marking, lighting, signals and hazard elimination. Functions include developing policies and guidance on safety issues; identifying crash clusters and designing countermeasures to crash trends; developing an annual safety program based on cost/benefit analysis of crash clusters; improving safety by addressing occupant protection and driver behavior. Other Bureau responsibilities include conduction speed zone, capacity, corridor and related studies; and railroad crossing safety and grade separations. The Bureau provides safety and traffic information, reviews, and expertise for design and construction professionals, other agencies

and the public; provides traffic and safety engineering expertise to district maintenance and construction personnel and city of county personnel through the District Traffic Engineers; and provides expertise and testimony on tort claims.

Describe the Job's Overall Purpose:

This position is the Traffic Signal Operations Engineer/ITS in the Traffic Engineering Section. The position is responsible for providing the engineering for ITS technologies, material, and equipment oversight including acceptance, quality assurance, procurement, etc. to ensure compliance with requirements, cost-effectiveness, and proper design. The position also conducts advanced traffic and traffic control device engineering studies to resolve safety problems or to enhance highway safety; and develops traffic engineering designs. The position also provides advanced training, guidance, and technical assistance to engineers, district and field project personnel, and consultants on specialized ITS applications and practices. The position reports to the Traffic Engineer Specialist (position # 36026)

SECTION II - Major Duties or Responsibilities

TRAFFIC SIGNAL OPERATIONS OVERSIGHT AND DEVELOPMENT 80% of Time

This position is responsible for professional traffic and electrical engineering oversight and management of electronic traffic control equipment including ITS procurement, inspection, and preparation for delivery to field, installation approval and operation.

1. Develops traffic signal operations policies, procedures, and standards for the 650+ traffic signals located statewide that agree with state and federal design and safety requirements to ensure technical validity and uniformity in application of traffic signal operations principles and practices, and appropriate consideration of traffic engineering elements of projects. Establishes new traffic signal operations policies and recommends changes in policies, specifications, standards, and design criteria.

2. Serves as the expert in traffic signal operations, practices, and designs for the Montana Department of Transportation. This includes managing the traffic signals systems statewide which includes isolated traffic signals and traffic signals within a coordinated system. The intersections may be pre-timed, actuated, or semi-actuated. Also serves as the technical expert in traffic signal operations to resolve complex and/or contentious issues affecting internal operations and activities, city/county/tribal interests, landowners, and others. Evaluates complaints, concerns, safety issues, and technical impediments; assesses system-wide impacts of engineering decisions; and develops expert recommendations to supervisor, Department managers, local government officials, project staff, attorneys, and others regarding specific issues.

3. Develops engineering alternatives and innovative approaches to traffic signal design (e.g., unexpected site conditions, design flaws, safety concerns, etc.). This involves advanced engineering design and research to determine how traffic signals statewide are to be designed. It also involves providing statewide guidance on how to resolve construction or design deficiencies.

4. Develops engineering alternatives and innovative approaches to traffic signal operations statewide to address identified safety and operational issues (e.g. lack of or poor progression along an arterial corridor, intersection capacity issues, geometric layout

configuration in combination with signal timing, and the balancing of the safety and efficiency of signalized intersections).

A. Review the existing facilities and compare the existing functional capabilities of these facilities to the present functional demands placed on them.

B. Identify the capability of the existing facility to accommodate anticipated increases and/or changes in functional demand in a safe and efficient manner.

C. Determine appropriate action plans to address the inadequacies of the facilities under review.

This is accomplished through an appropriate combination of the following engineering analysis techniques organized to fit the individual needs of each assignment. Examples of those analysis techniques are: traffic control assessment, roadway functional class assessment, crash analysis, capacity analysis, pedestrian studies, and geometric analysis.

The action plan is developed through comprehensive interpretation of the results of the above studies related to the proposed goals of the assigned project using current transportation and traffic engineering practices. These assignments also require the results to be reported effectively in writing, graphically, and through oral presentation.

This work requires design, implementation, use of advanced statistical research and analysis, and computer-aided modeling. This also involves follow-up studies to ensure expected results are accomplished.

5. Reviews and coordinates consultant design projects for electrical/ITS work to ensure compliance with applicable MDT, federal, state, and local standards and to ensure designs are cost-effective, constructible, biddable, and accurate.

6. Provides traffic signal operations expertise to District Offices, counties, governmental agencies, consultants, and others regarding traffic engineering project design practices; project monitoring; and construction regulations, codes, and criteria in the evaluation of traffic control devices to ensure highway safety and that devices and controls meet Manual on Uniform Traffic Control Devices and MDT design criteria.

7. Directs or performs the evaluation and resolution of traffic signal site problems and equipment malfunctions to ensure highway safety; develops solutions to complex traffic signal operations problems referred by subordinate staff, other Department/District personnel, contractors, city/county/tribal officials, other State and federal agencies, and other parties to ensure that engineering and safety standards are met; provides direction to district maintenance staff in the appropriate maintenance, repair, and installation of traffic control devices.

8. Researches and monitors continually changing methods, technologies, laws, and professional standards related to traffic signal operations and safety to incorporate appropriate innovations into ongoing project plans. Develops and maintains working relationships with other staff, professional associations, and others to exchange information regarding program operations and proposed changes.

9. Oversees the preparation of project engineering and design data for traffic signal operations (e.g., site surveys, etc.) to ensure all involved project staff and consultants are aware of project requirements. This work requires the design, implementation, and oversight of

advanced statistical research and analysis, computer-aided modeling, and physical testing practices and technology.

10. Develops the scope of work for traffic signal operations projects, requiring innovative and advanced designs.

11. Participates in public hearings and information dissemination activities to ensure the proper flow of accurate project information and facilitate local involvement and cooperation. This involves identifying pertinent project information and presenting it to impacted citizens, responding to public questions and concerns, initiating changes in plans resulting from public hearings, coordinating efforts to minimize adverse environmental or aesthetic impacts, and providing justifications for unavoidable impacts.

12. Directs and oversees project staff to ensure compliance with established engineering standards and practices, and to ensure adherence to design plans, project scope, and established timelines; oversees the work of engineering consultants and contractors involved in traffic signal operations activities by providing direction and guidance regarding work methods and priorities, professional and technical assistance, quality assurances, contract compliance, and adherence to design plans and sound traffic engineering standards; adjusts schedules and project priorities as needed in response to potential schedule problems, and other project problems.

B. ITS TECHNOLOGIES **15% of Time**

This position is the engineering representative in the development of policies, procedures, and standards for the Intelligent Transportation Systems (ITS) program; develops ITS program specifications, cost estimates, and quality control requirements; researches and evaluates ITS technologies for use in highway safety projects including signing, geometric features, pavement marking, lighting, signals and hazard elimination; and serves as a technical expert in ITS technologies, practices, and designs as related to traffic engineering and safety.

1. Develops ITS specifications, cost estimates, and quality control requirements for ITS technologies, devices, materials and equipment to ensure uniformity, ease of operation and maintenance, and cost effectiveness.

2. Researches and evaluates various ITS technologies for use in all highway projects. This involves determining data requirements and resources; researching and analyzing data; identifying and assessing problems; and recommending solutions to specialized traffic engineering issues by using ITS technologies.

3. Serves as a technical expert in ITS technologies, practices, and designs as related to traffic and transportation engineering and safety for the Montana Department of Transportation. This includes interpreting and explaining advanced technical aspects of technologies; applications; designs; and analyzing, evaluating, and making recommendations to project managers on problems encountered in the field.

4. Participates in the development and provides technical expertise in the acceptance testing for all ITS technologies, materials and equipment by analyzing project plans, determining feasibility of incorporating ITS technology, comparing material certification and equipment specifications with the plan criteria and/or agency standards; coordinates approval, installation, and final acceptance of ITS technologies and materials with district construction staff.

5. Prepares details and cost estimates for various types of ITS technologies by writing special provisions to assist manufacturers, contractors, and field inspectors in the construction of the designed facilities.

6. Provides ITS advice and technical expertise to District Offices, counties, governmental agencies, consultants, private businesses and the public regarding design-related questions on projects. This includes participating in meetings to discuss options for incorporating ITS technology in highway designs; developing ITS solutions to engineering design problems; reviewing ITS design alternatives prepared by consultants; and synthesizing ITS technology analyses, design proposals, project costs and time impacts, and feasibility of alternatives.

C. <u>Other duties as assigned</u> **5% of Time**

Perform a variety of other technical, professional, and administrative duties in support of the Engineering Services Section as assigned by the supervisor. This includes coordinating and performing special studies and projects, providing backup for the supervisor and other staff, representing the agency at meetings and conferences, and attending continuing education and training.

The following mental and physical demands are associated with these essential functions:

PHYSICAL

- Lifting objects up to 50 lbs.
- Extensive travel throughout the state and nation
- Ability to walk over uneven terrain
- Operation of power tools and/or equipment
- Exposure to high voltage electrical systems
- Exposure to extreme weather and high-speed traffic
- Operation of motor vehicles

MENTAL

- Comparing data
- Computing arithmetic operations
- Compiling information, analyzing, coordinating, synthesizing, negotiating, instructing
- Ability to multi-task
- Decision-making that affects the public health and safety
- Dealing with the public on a regular basis
- Interpersonal skills/behaviors
- Demands for accuracy in all aspects of work
- Communicating in writing, in person and over the phone
- Operating a personal computer
- Ability to meet inflexible deadlines

2. Does this position supervise others? ☐ **Yes** ☑ **No**

3. Attach an Organizational Chart.

SECTION III - Minimum Qualifications - List minimum requirements for the first day of work.

Critical knowledge and skills required for this position:

KNOWLEDGE:
The position requires an advanced knowledge of ITS technologies, devices, materials and equipment; the principles and practices of traffic and electrical/electronic engineering including trigonometry, geometry, and calculus; physics; traffic signal systems; engineering mechanics; analytical and problem solving methods; and engineering plan organization. The position also requires knowledge of the Manual on Uniform Traffic Control Devices; state and federal traffic engineering regulations; accident analysis techniques; the functions of traffic control equipment; public relations methods and techniques; and written and verbal communications including presentation methods and technical writing. The position requires knowledge of Computer Aided Drafting Design (CADD) operations; roadway plans and specifications; utility and right-of-way plans; and highway layout. Training and technical assistance duties require knowledge of classroom and on-the-job training methods and techniques; construction and maintenance processes; state and federal standards; technical writing principles, and computer-assisted design software.

SKILLS:
The position requires skill in the preparation of engineering designs for electrical and traffic engineering projects to ensure a constructible set of plans; preparing plans on CADD and preparing all documentation associated with the project; the operation of traffic control study and control devices; the use of computers and applicable software including CADD; analyzing and evaluating engineering designs; specialized analytical methods and techniques; and analyzing and interpreting statistical information.

Behaviors required to perform these duties:

See MDT Core Behaviors

Education:
Check the one box indicating minimum education requirements for this position for a new employee the first day of work:

- ☐ No education required
- ☐ High school diploma or equivalent
- ☐ 1-year related college/voc. training
- ☐ Related AAS/2-years college/vocational training
- ☑ Related Bachelor's Degree
- ☐ Related Master's degree

Please specify the acceptable fields of study:

Acceptable: The position requires a Bachelor's degree in Civil Engineering, Electrical Engineering, or a related field.

Other education, training, certification, or licensing required (specify):
PE registration is required.

Experience:

Check the one box indicating minimum work-related experience requirements for this position for a new employee the first day of work:

- ☐ No prior experience required
- ☐ 1 year
- ☐ 2 years
- ☐ 3 years
- ☐ 4 years
- ☑ 5 or more years

Other specific experience (optional):

Alternative Qualifications:
This agency will accept alternative methods of obtaining necessary qualifications.

☐ Yes ☑ No

Alternative qualifications include:

SECTION IV – Other Important Job Information

- ☐ Fingerprint check
- ☐ Background check
- ☑ Valid driver's license
- ☐ Other; Describe

Other information including working conditions such as shifts, lifting requirements, travel or hours.

SECTION V – Signatures

Signature indicates this statement is accurate and complete.

Employee:

Name: _____ Title: _____

Signature: _____ Date: _____

Immediate Supervisor:

Name: _____ Title: _____

Signature: _____ Date: _____

Bureau Chief:

Name: _____ Title: _____

Signature: _____ Date: _____

Division/District Administrator:

Name: _____ Title: _____

Signature: _____ Date: _____

Department Designee:

Renee McDaniel/Designee — Acting Chief Human Resources, Human Resources Division

Signature: _____ Date: _____